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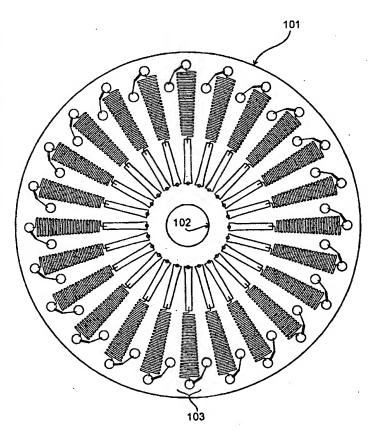
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(54) Title: BIDIRECTIONAL FLOW CENTRIFUGAL MICROFLUIDIC DEVICES



(57) Abstract: This invention relates to methods and apparatus for performing microanalytic and microsynthetic analyses and procedures. The invention particularly provides microsystem platforms for achieving efficient mixing of one or a plurality of fluids on the surface of the platform when fluid flow is motivated by centripetal force produce by rotation.

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C.(Continu	ation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication where appropriate, of the relevant passages		Relevant to claim No.
X Y	US 5 160 702 A (KOPF-SILL ANNE R ET AL) 3 November 1992 (1992-11-03)		24
	column 1, line 14 -column 1, line 33 column 3, line 38 -column 4, line 19 column 5, line 7 -column 6, line 63 column 7, line 5 -column 8, line 6 column 8, line 22 -column 8, line 51 column 9, line 1 -column 9, line 26 figures 1-20		26,32
	GB 2 341 924 A (AMERSHAM PHARM BIOTECH AB) 29 March 2000 (2000-03-29)		25
	<pre>page 1, line 12 -page 1, line 19 page 10, line 8 -page 13, line 8 figures 1-8</pre>		8,15,31
	US 5 300 779 A (ALLEN JIMMY D ET AL) 5 April 1994 (1994-04-05) column 5, line 42 -column 5, line 58 column 7, line 21 -column 7, line 29 column 21, line 4 -column 21, line 31 column 21, line 44 -column 22, line 32 figures 1-5		. 19
	US 5 976 896 A (LEUNG DANTON KAI-YU ET AL) 2 November 1999 (1999-11-02) column 6, line 50 -column 6, line 56 figures 1-4		26,32
			
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	a a	y.	
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					101/03	01/15824
	Patent document cited in search report		Publication date		Patent family member(s)	Publication date
	US 3744975	A	10-07-1973	AT AU BE CA CH DE DK ES FR GB IL JP JP NO SE	322880 B 4911972 A 792465 A1 966333 A1 549209 A 2260292 A1 148520 B 409317 A1 2164306 A5 1371465 A 40915 A 984613 B 1046891 C 48066481 A 55036937 B 7216233 A ,B, 138303 B 384086 B	10-06-1975 23-05-1974 30-03-1973 22-04-1975 15-05-1974 14-06-1973 22-07-1985 16-12-1975 27-07-1973 23-10-1974 13-03-1975 20-11-1974 28-05-1981 12-09-1973 25-09-1980 13-06-1973 02-05-1978 12-04-1976
į	JS 5160702	Α	03-11-1992	NONE		
(GB 2341924	A	29-03-2000	AU. EP GB WO	3624399 A 1077771 A1 2350678 A 9958245 A1	29-11-1999 28-02-2001 06-12-2000 18-11-1999
	JS 5300779	A	05-04-1994	USSUSSUST AU ACE DE DE DE DE EPPPPJPPJPPJPPJPPJPPJPPJPPJPPJPPPJPPPJ	4948961 A 5004923 A 5164598 A 4756884 A 5144139 A 5204525 A 5140161 A 105084 T 593001 B2 6088486 A 1275231 A1 3650530 D1 3650574 D1 3650574 T2 3650610 D1 3650610 T2 3689812 D1 3689812 T2 0212314 A2 0483117 A2 0485368 A2 0488994 A2 7092169 A 7104356 B 1945801 C 6058373 B 62129759 A 2032116 C 6094722 A 7069330 B 2595422 B2	14-08-1990 02-04-1991 17-11-1992 12-07-1988 01-09-1992 20-04-1993 18-08-1992 15-05-1994 01-02-1990 12-02-1987 16-10-1990 18-07-1996 21-11-1996 31-10-1996 31-10-1996 13-03-1997 01-06-1997 01-06-1994 01-09-1994 04-03-1987 29-04-1992 13-05-1992 03-06-1992 07-04-1995 13-11-1995 23-06-1995 03-08-1994 12-06-1987 19-03-1996 08-04-1994 26-07-1995 02-04-1997

TERNATIONAL SEARCH REPORT

Information on patent family members

Ir. na	Application No
PCT/US	01/15824

Patent document dted in search report		Publication date		Patent family member(s)	Publication . date
US 5300779	A		JP JP	6094723 A	08-04-1994
			JP	2075360 C 6094724 A	25-07-1996 08-04-1994
			JP	7117546 B	18-12-1995
			US 	4963498 A	16-10-1990
US 5976896	Α	02-11-1999	US	5624850 A	29-04-1997
			AU	· 732627 B2	26-04-2001
			ΑU	3807097 A	20-02-1998
			BR	9710887 A	17-08-1999
			EP	0934524 A2	11-08-1999
			WO	9804920 A2	05-02-1998